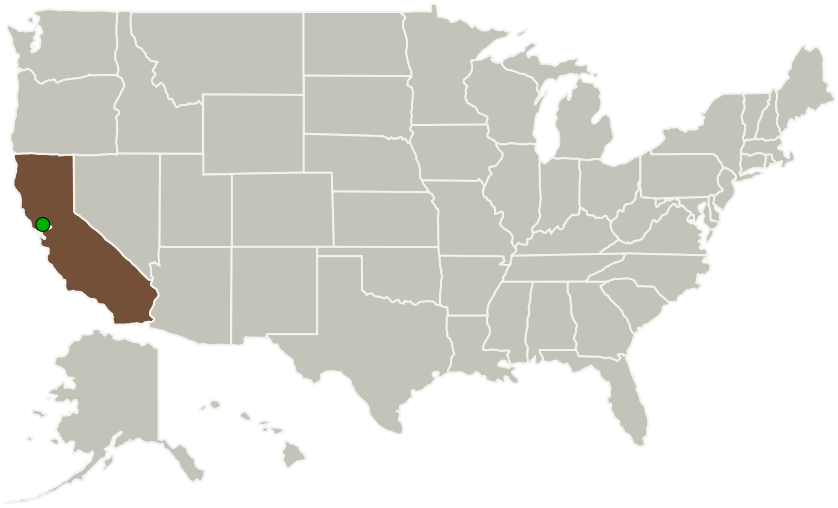
Stochastic Queuing Model Analysis to Support Airspace Super Density Operations (ASDO), Phase I

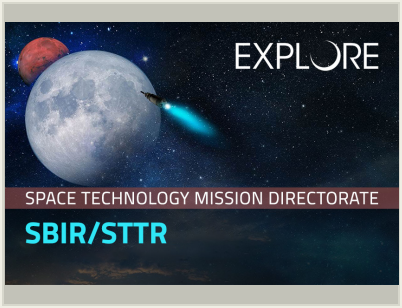
Completed Technology Project (2010 - 2010)

Project Introduction

NASA has been involved in extensive research efforts to develop advanced concepts, technologies, and procedures for the Next Generation Air Transportation System (NextGen). The research focus area Airspace Super-Density Operations (ASDO) pertains to highly efficient operations at the busiest airports and terminal airspace. Deterministic analysis of the proposed NextGen concepts may not be sufficient, as inability of aircraft to adhere to flight schedules exactly and operational uncertainties may significantly alter the effectiveness of the proposed concepts. The primary objective of this research proposal is to create a High-Fidelity Queuing Model of the Terminal Area and a Framework for Performing Time-Varying Stochastic Analysis of Terminal Area Operations with regards to Input Schedule and Operational Uncertainties. This Queuing Model can be used to evaluate the interaction and combined performance of multiple NextGen concepts in the ASDO research focus area. The Phase I effort will develop a sample Queuing Network Model for a moderately complex terminal area, e.g. JFK. The utility of the developed Queuing Model and Analysis Techniques will be illustrated using two case-studies in the JFK terminal area. Phase II research effort proposes to develop integrated surface/terminal area queuing model of a Metroplex. Stochastic analysis of the Metroplex will be accelerated in Phase II using Graphics Processing Units.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Optimal Synthesis, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Los Altos, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139372)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Optimal Synthesis, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Monish D Tandale

Co-Investigator:

Monish D Tandale

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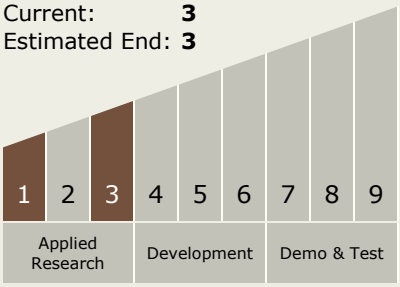
Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.6 Integrated Modeling, Simulation, and Testing

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System